

**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION**

STAFF REPORT FOR REGULAR MEETING OF MARCH 21, 2008

Prepared on January 18, 2008

ITEM NUMBER:

SUBJECT: **Consideration and Discussion of Monitoring and Reporting Program No. R3-2008-0016 (Attachment E), City of Watsonville Wastewater Treatment Plant and Revised Monitoring and Reporting Program No. R3-2005-0003 (Attachment E), City of Santa Cruz Wastewater Treatment Plant, Santa Cruz County**

KEY INFORMATION:

Treatment System Location	401 Panabaker Lane, Watsonville	110 California St., Santa Cruz
Discharge Type	Municipal wastewater	Municipal wastewater
Design Capacity	12 million gallons per day (MGD)	17.0 MGD
Current flowrate	7.5 MGD	11.8 MGD
Treatment:	Secondary	Secondary
Disposal	Ocean outfall to Monterey Bay	Ocean outfall to Monterey Bay
Reclamation	Beginning August 2008	None

SUMMARY

At the March 21, 2008, public meeting, the Board will consider updated waste discharge requirements for Monterey Regional Pollution Control Agency (Monterey Regional) and Carmel Area Wastewater District (CAWD). The Board will also consider the Monitoring and Reporting Programs (MRPs) proposed for the City of Watsonville and the City of Santa Cruz.

Staff proposes the Board consider the four MRPs at this public hearing because each discharger participates in CCLEAN's (Central Coast Long-Term Environmental Assessment Network) regional monitoring program. Therefore, the MRPs share many features, which indicates the Board should consider them together.

BACKGROUND

Waste Discharge Requirements (WDRs) Order No. R3-2003-0040, an NPDES permit that expires on May 16, 2008, regulates the discharge from the City of Watsonville's wastewater treatment plant. To renew the permit, staff is drafting WDRs Order No. R3-2008-0016, which staff proposes to submit for the Board's consideration at the May 9, 2008 public hearing in San Luis Obispo. When its permit expires, staff will submit a draft WDR Order in May 2009 to renew the City of Santa Cruz's permit.

The four municipalities that currently participate in the regional monitoring program discharge treated municipal wastewater into Monterey Bay. In accordance with CCLEAN's charter, the regional monitoring program employs a High-volume Water Sampling (HVWS) method to monitor the discharges to determine the sources of pollutants found in nearshore waters. Additionally, since May 2005, the City of Santa Cruz has sampled its effluent to demonstrate compliance with its permit's effluent limitations using a proven HVWS method, a semi-permeable membrane device. As discussed in more detail below, HVWS allows detection of pollutants present in wastewater at low concentrations by capturing all the pollutant present in a large volume of wastewater. In particular, HVWS allows detection of persistent and bioaccumulative pollutants at concentrations below their effluent limitations, thereby allowing compliance with limitations to be determined. Grab samples or 24-hour composite samples do not provide the necessary pollutant mass or sample volume to enable analytical methods to detect these pollutants at concentrations below effluent limitations. The following section provides more detailed information on HVWS systems.

High volume water sampling (HVWS) (integrative sampling).

Some synthetic chlorinated hydrocarbons strongly resist bacterial degradation. Therefore, these compounds persist in the environment, some essentially forever. These persistent organic pollutants include dioxins, chlorinated pesticides, polychlorinated biphenyls (PCBs), polybrominated biphenyls (PBBs), and polybrominated biphenyl ethers (PBDEs). Persistent organic pollutants often accumulate in fatty tissues of higher aquatic life forms as they prey on lower forms, and can thereby increase to levels that cause cancer and mutations. Consequently, Congress banned the production and use of chlorinated pesticides and PCBs. High temperature or highly corrosive processes continually generate dioxins as waste byproducts. The California Ocean Plan specifies very low water quality objectives for persistent organic pollutants because of their ability to bioaccumulate to toxic levels. For example, for dioxin (by far the lowest limit), the Ocean Plan limit is approximately 4 billionths of a millionth of a gram per liter of seawater (3.9×10^{-9} mg/L or 3.9×10^{-15} g/L).

Effluent and receiving water monitoring conducted by this Region's CCLEAN has continually found persistent organic pollutants. (CCLEAN does not currently monitor dioxins, however). CCLEAN is able to detect the persistent organic pollutants by employing integrative HVWS instead of the usual 24-hour composite of 24 discrete grab samples. In CCLEAN's HVWS, for 30 days a constant-flow effluent stream split from the plant's discharge is passed, after filtration, through a column packed with beads of a specially formulated resin, which captures all the persistent organic pollutants in the split stream. Sampling is conducted over two 30-day periods, one in summer and one in winter. The mass of each persistent organic pollutant is determined by standard analysis of the extract from the resin and filter. Knowing the volume of wastewater from which the persistent organic pollutants were obtained, the average concentration in the wastewater of each persistent organic pollutant can then be determined.

HVWS over two 30-day intervals every year provides a much more representative sample than the 24-hour composite, which is composed of 24 small grab samples taken on one day. The pollutant is usually present in the HVWS extract in amounts that are detectable by standard analytical procedures. Moreover, when the large sample volume (say 200 L) is factored in, very low concentrations can be demonstrated. CCLEAN is thereby able to report effluent persistent organic pollutant concentrations on the order of 10 pg/L (10×10^{-12} g/L).

24-hour composite effluent samples from some of this Region's plants (obtained in accordance with the Board's monitoring and reporting programs) have occasionally detected dioxins,

sometimes in greater concentrations than permit limitations. These sporadic results indicate the presence of dioxins in municipal plant effluent. Published studies have found possible dioxin sources to be bleached paper, such as toilet tissue, and wastewater plant chlorination processes.

When analyzing the usual 24-hour composite or grab sample volume, EPA Method 1613B achieves approximately 10 pg/L as the lower limit of detection, which exceeds, for example, the City of Santa Cruz's dioxin effluent limit of 0.55 pg/L. (Effluent limits of other CCLEAN participants are similar) Therefore, HVWS provides the only means of detecting dioxins and other similar persistent organic pollutants at levels below permit limits, and at levels above permit limits but below the grab sample detection limit; i.e. from 0.001 pg/L to 10 pg/L. HVWS has detected dioxin at 0.001 pg/L in water, which is well below the effluent limitation.

DISCUSSION

Sporadic detection of toxic dioxin in small samples of this Region's municipal discharges to fresh and marine waters emphasizes the need to extend HVWS to all such discharges to determine the extent that both regulated and unregulated toxic pollutants may threaten the beneficial uses of surface waters and groundwaters. The CCLEAN participants other than the City of Santa Cruz (City of Watsonville, Monterey Regional and CAWD) have not monitored their discharges to demonstrate compliance with permit effluent limitations because that has not been CCLEAN's goal. Therefore, the regional monitoring program has not looked for all Ocean Plan toxic pollutants, including dioxin.

In 2007, therefore, staff initiated planning by regional monitoring program participants to investigate the feasibility of monitoring the four discharges to Monterey Bay with the same HVWS method(s) to both achieve CCLEAN's goals and to assess compliance with effluent limitations. In staff's view, this approach would be more efficient and cost-effective than using two HVWS methods, one for CCLEAN and the other to determine permit compliance.

Secondly, staff requested the CCLEAN participants develop a list of compounds of emerging concern to include in the MRPs. Currently, no State Water Quality Control Plan establishes objectives for compounds of emerging concern although they threaten the health of humans and animals, and are often detected in ambient waters or municipal wastewaters. That is, compounds of emerging concern often threaten to impair beneficial uses of marine waters, and fresh surface waters and groundwaters. Staff and the CCLEAN participants agree they should monitor their discharges for these pollutants. If monitoring detects compounds of emerging concern, subsequent actions could include public education campaigns or other actions.

Accordingly, CCLEAN's advisor developed the Draft 2008-2013 CCLEAN Five-year Plan (Plan), which responds to staff's requests, as follows:

1. The Plan was not able to resolve differences between the current CCLEAN sampling method (resin beads), the SPMD, and the POCIS (Polar Organic Chemical Integrative Sampler) methods. As discussed below, the proposed MRPs require the CCLEAN participants to resolve these issues and recommend the appropriate HVWS method(s).
2. The Plan recommends three classes of compounds of emerging concern for effluent monitoring, as follows:

- a. Polybrominated biphenyl ethers (PBDEs) are widely used flame retardants often detected by CCLEAN monitoring. In a manner similar to PCBs, PBDEs may disrupt nervous system development.
- b. Polyfluorinated compounds (PFCs) may adversely affect wildlife and are found in high concentrations in wastewater. The CCLEAN advisor proposed a screening study for PFCs.
- c. The Ocean Plan's Table B does not include many endocrine disrupting compounds. Evidence of adverse effects of endocrine disrupting compounds of aquatic life accumulates from day to day. Although a discharge may comply with the Ocean Plan's constituent-specific objectives and current whole effluent toxicity tests may find no chronic toxicity, the discharge may impair the health of aquatic life by disrupting the development of the young or by adversely altering the sex distribution. The Plan proposes the CCLEAN participants jointly employ a proven bioassay procedure to evaluate the influence of effluent endocrine disrupting compounds on the health of marine fish.

COMPLIANCE HISTORY

Since May 2005, Santa Cruz has sampled its effluent with a SPMD and has detected a number of pollutants not found in 24-hour composite samples, the prior sampling method. In particular, Santa Cruz found several congeners (or species) of dioxin and several of furan. No dioxin was present at a concentration that caused violation of its effluent limitation.

In addition, CCLEAN's regional monitoring program has also detected similar pollutants using its HVWS, including 46 congeners of the compounds of emerging concern PBDE, among others.

CONCLUSION

In contrast to the results of analyzing 24-hour composite samples, monitoring with HVWS has allowed the City of Santa Cruz to determine permit compliance for pollutants with low effluent limitation, including dioxin. Therefore, HVWS methods should be used to sample all municipal and industrial discharges to surface and groundwaters, including the discharges of the CCLEAN participants to Monterey Bay.

RECOMMENDATIONS

To monitor the discharges for compounds of emerging concern, staff proposes to add requirements for semiannual monitoring of polybrominated diphenyl ethers and polybrominated biphenyls to Table E-4, to semiannual monitor PFCs after a screening study discussed below, and to semiannual biological monitoring of the effects of endocrine disrupting compounds, if any, after the discharger, in concert with the other CCLEAN participants, specifies the bioassay procedure to be used. Staff proposes to add the pollutants to Table E-4.

To extend HVWS to all CCLEAN participants for permit compliance, staff proposes to add the following footnotes to Tables E-3 and E-4:

The Discharger shall utilize high volume water sampling (HVWS) methods employed by the CCLEAN program for compliance determination of the Table B pollutants and other pollutants, when appropriate, provided the subsequent analytical methods are in

accordance with 40 CFR 136 or as allowable per the Implementation Provisions for Table B contained in section III.C.5.b of the Ocean Plan.

The Discharger shall select, in concert the other CCLEAN participants, the appropriate HVWS Integrative method or methods to monitor the discharges from their respective treatment plants for Table B pollutants, the remaining priority pollutants, and the chemicals of emerging concern in Table E-4. **By May 21, 2008**, the Discharger shall submit, for the approval of the Executive Officer, a technical report describing the following, but not necessarily limited to, the following: the basis for the choice of the selected method(s), and the pollutants detectable by each method. The Discharger shall implement the selected method in accordance with Footnote No. 2,

To monitor the discharges for compounds that disrupt the sex hormone systems of marine fish, staff proposes to add the following footnote to Table E-4:

By July 1, 2008, the Discharger shall submit a technical report, for the approval of the Executive Officer, describing an integrative biological method (bioassay) to monitor the effects of endocrine disrupting compounds on indigenous marine fish. The Discharger shall develop the technical report in concert with the other CCLEAN members. The bioassay shall be a proven method and shall be employed sequentially by each CCLEAN member. The technical report shall provide for bioassay implementation no later than August 1, 2008.

To monitor the discharges for polyfluorinated compounds, staff proposes to add the following footnote to Table E-4:

By July 1, 2008, the Discharger shall submit a technical report describing a screening study for polyfluorinated compounds. The Discharger shall develop the technical report in concert with the other CCLEAN members. The technical report shall provide for screening study implementation no later than **August 1, 2008**.

The MRPs also provide that the Discharger may reduce the sampling frequency to annually after the first year if no compounds of emerging concern are detected.

ATTACHMENTS

1. Draft Monitoring and Reporting Program No. R3-2008-0016 for the City of Watsonville
2. Draft Revised Monitoring and Reporting Program No. R3-2005-0003 for the City of Santa Cruz.